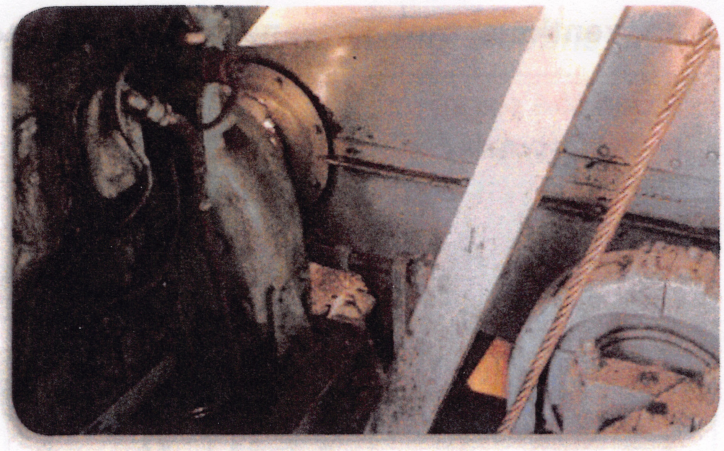
Module 5
Principles of Power Flow



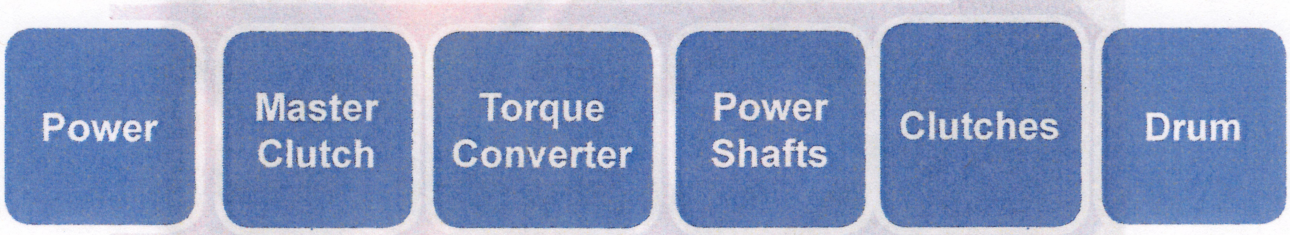
Learning Objectives

By the end of this section, you will:

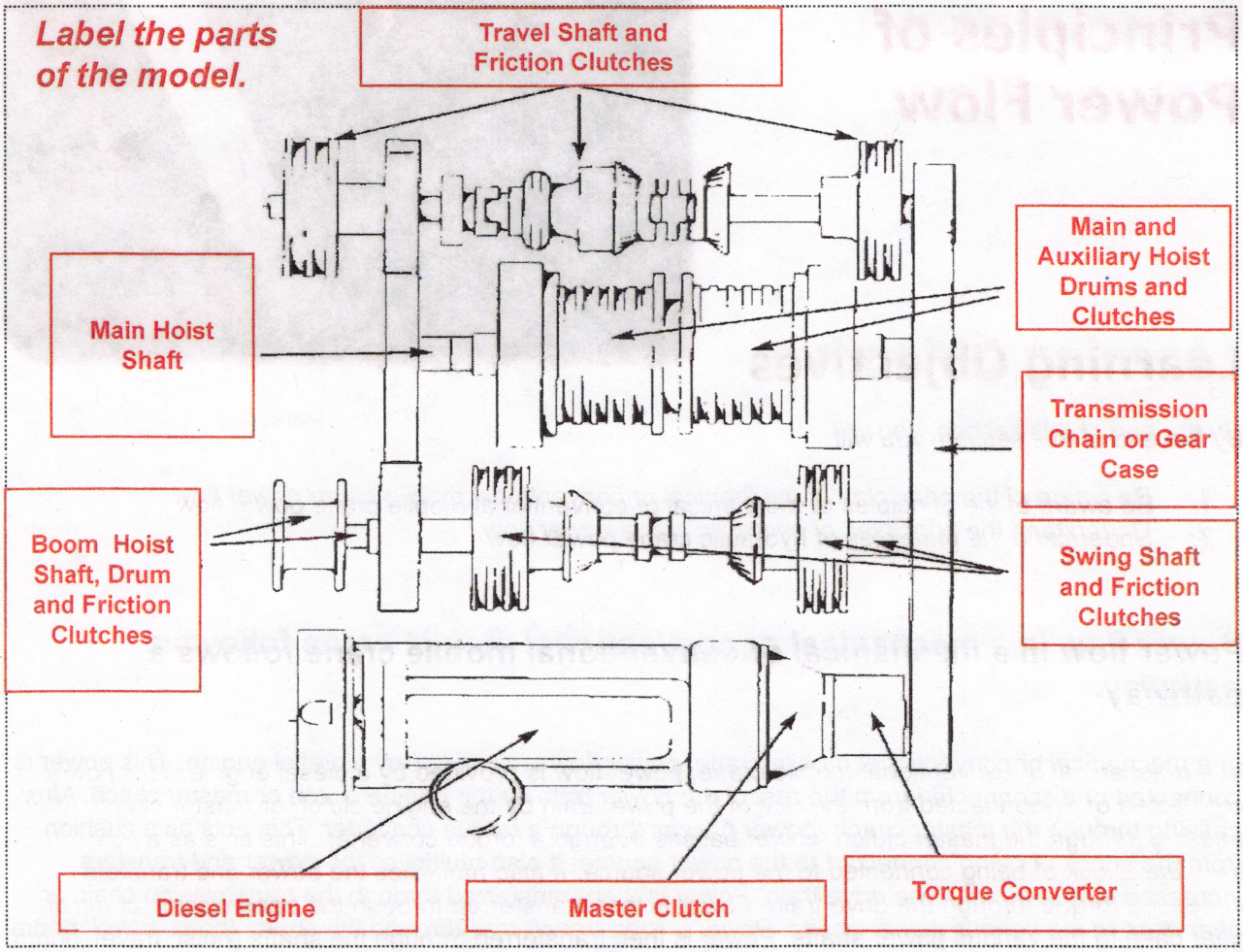
1. Be aware of the principles of mechanical or conventional mobile crane power flow.
2. Understand the principles of hydraulic crane power flow.

Power flow in a mechanical or conventional mobile crane follows a pathway.

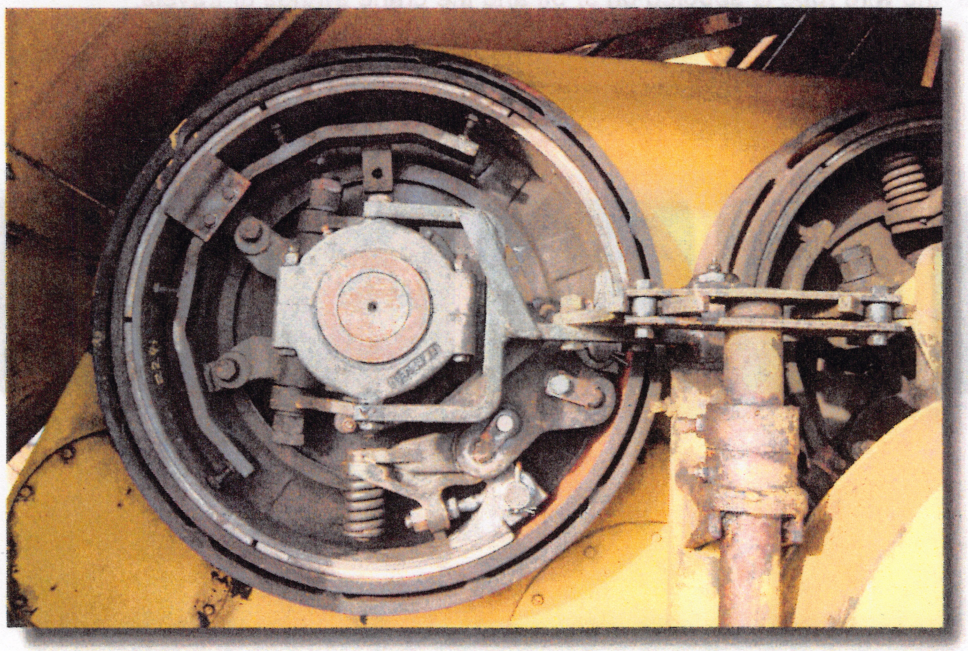
In a mechanical or conventional mobile crane, power flow is provided by a diesel engine. This power is connected or disconnected from the rest of the power train by the engine clutch or master clutch. After passing through the master clutch, power passes through a torque converter. This acts as a cushion from the shock of being connected to the power source. It also multiplies the power and transfers increased torque through the drive train. Power is then transferred through the transmission chain or gear case to the various power shafts. Power is then transferred through the shafts (hoist, travel, boom, swing) to the friction clutches. When activated from the operator's control station, the spinning friction clutches expand against the drum, thus transferring power and causing the drum to rotate. When the drum rotates, the wire rope is spooled on or off and the crane swings or travels.



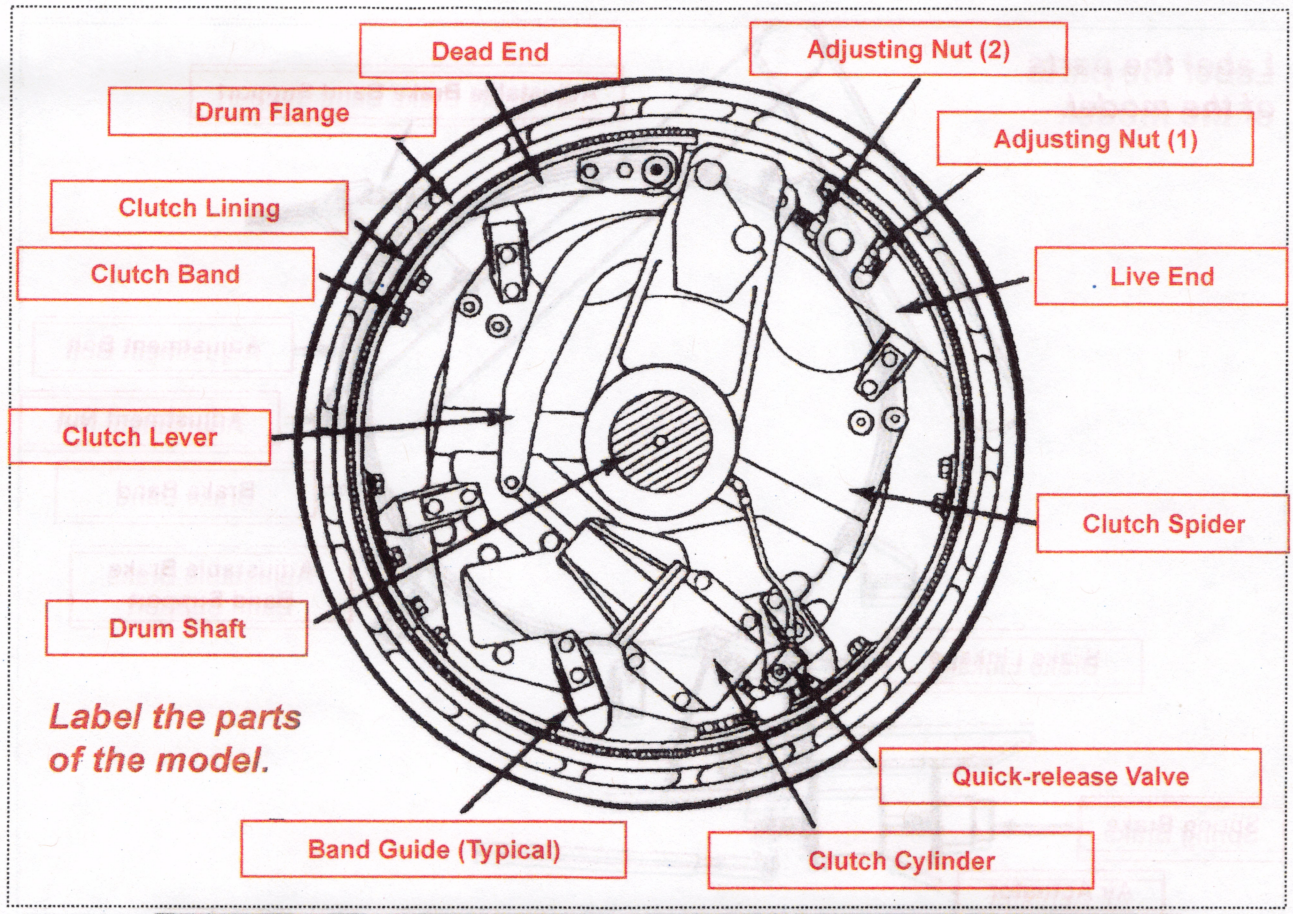
A conventional mobile crane power flow model:

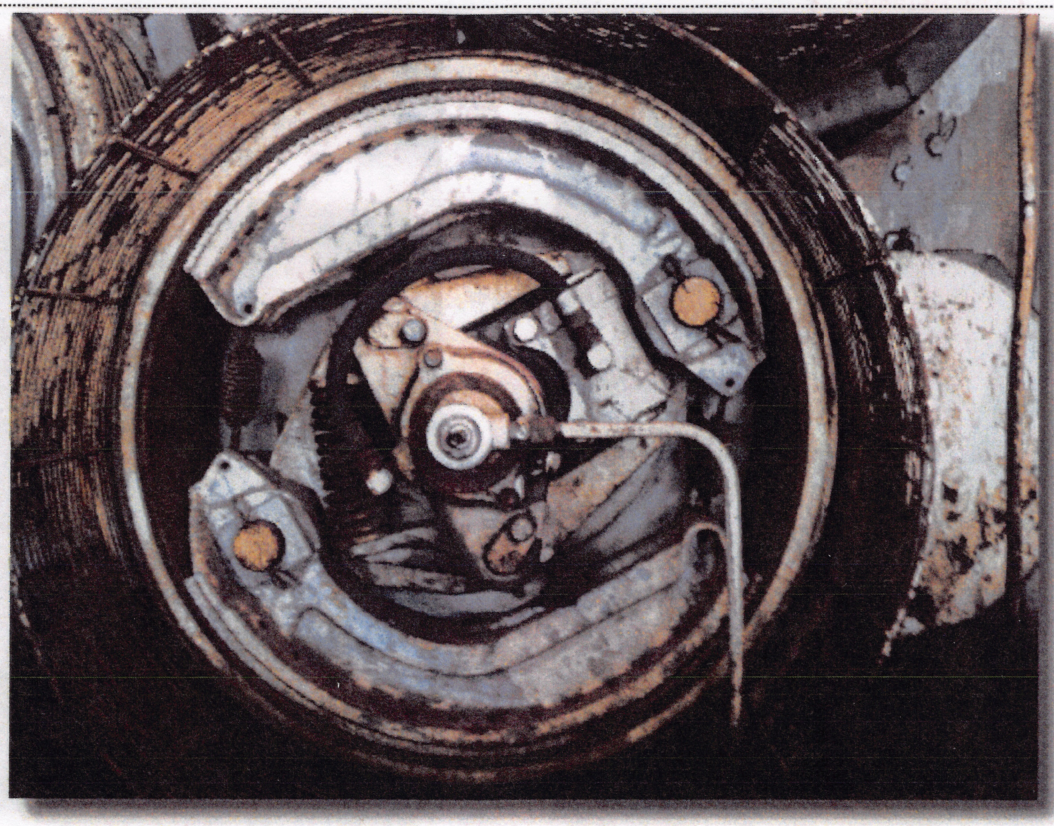


Also called reverse clutches (called swings or swingers.)



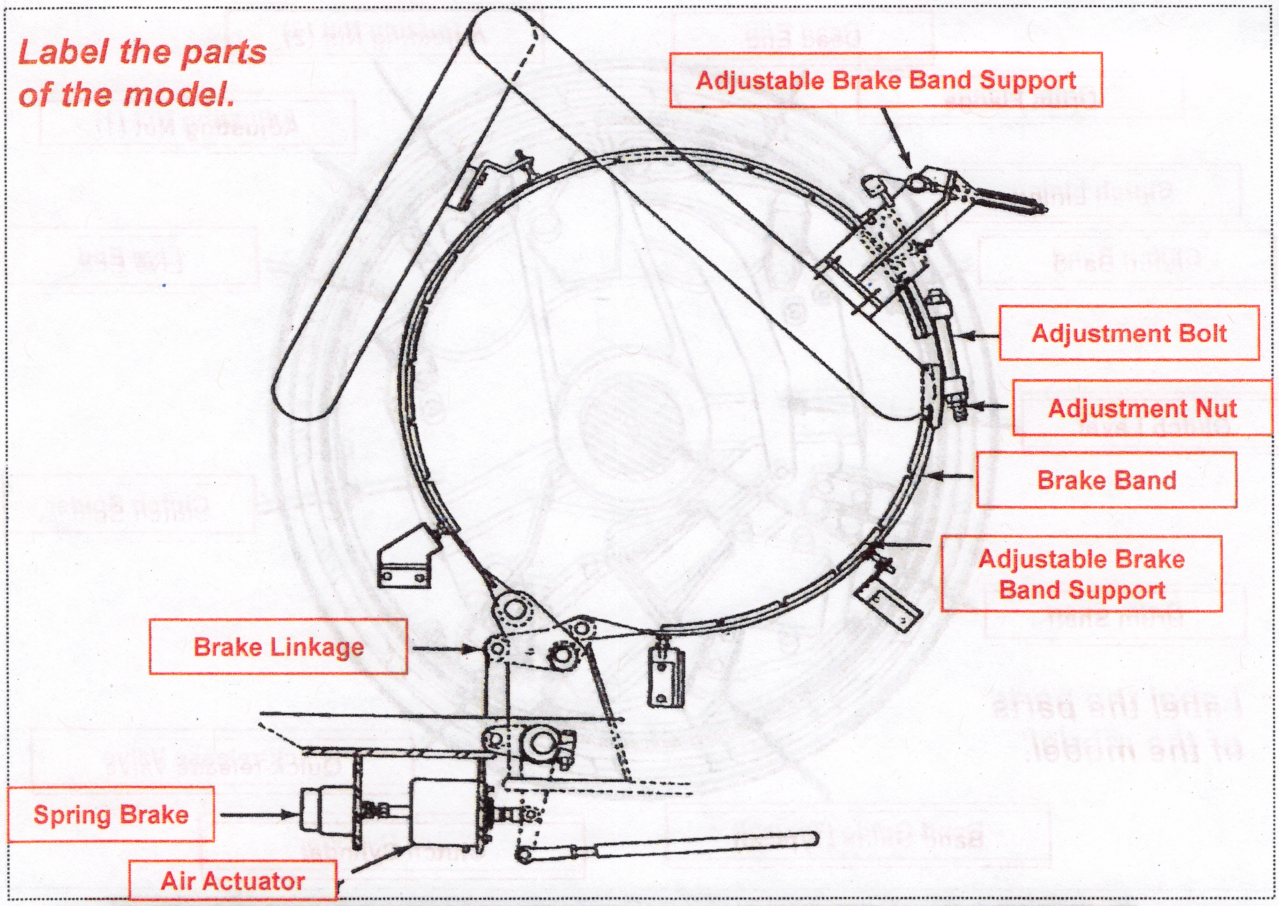
A friction clutch:

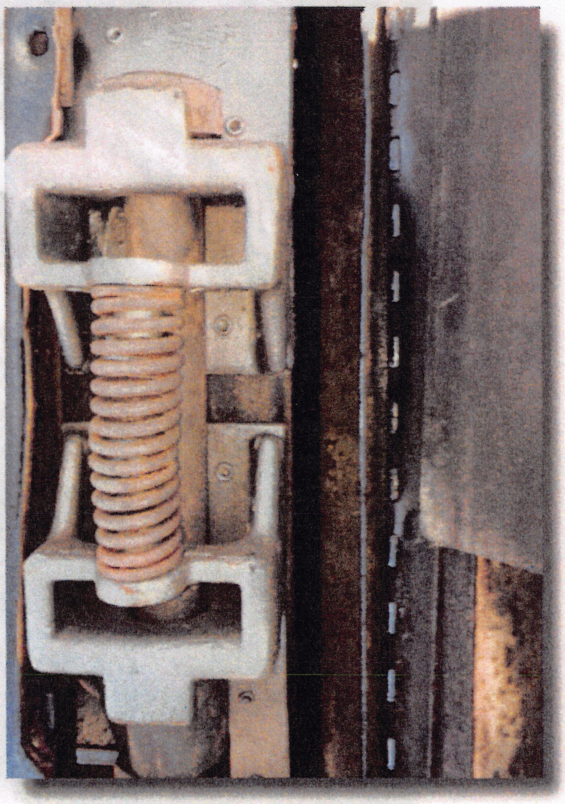




A conventional mobile crane mechanical brake:

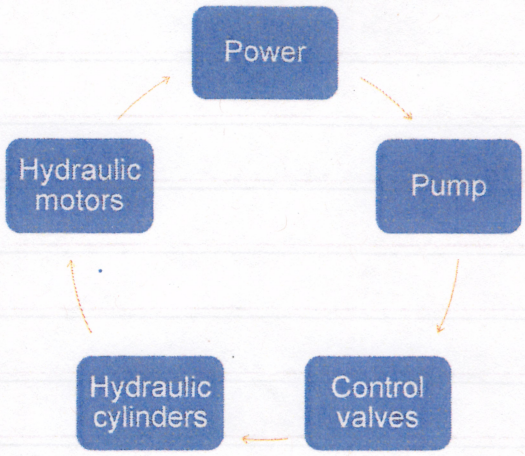
Label the parts of the model.





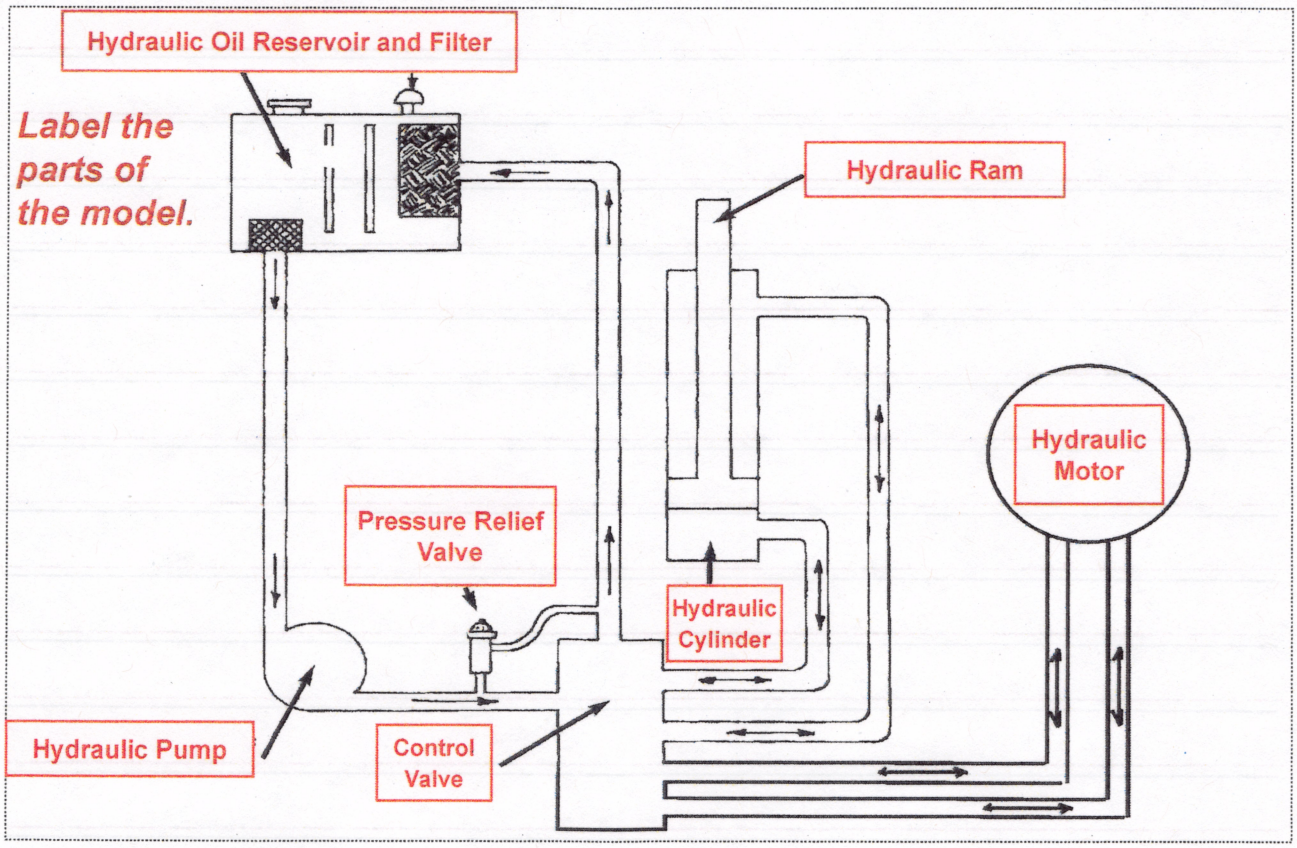
Power flow in a hydraulic crane follows a pathway.

Power is generated by a diesel engine with a hydraulic pump attached. The pump ensures that there is enough flow/pressure to push the hydraulic oil through a loop containing the hydraulic reservoir and filter. From the operators station, control valves may be actuated, diverting oil from the loop to either a hydraulic cylinder or hydraulic motor. Hydraulic cylinders raise and retract the boom, and extend and retract the outriggers when the pressure in the lines that contain the hydraulic fluid is changed. Hydraulic motors provide power to hoisting and swing functions.



About the only way that the hydraulic crane power flow is similar to the conventional mobile crane power flow system is that the primary power supply is the engine.

A hydraulic crane power flow model:



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